

Hall Ticket Number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Code No. :16108 AS N (F)

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) VI-Semester Advanced Supplementary Examinations, July-2019

Optimization Methods for Engineers
(Open Elective-VII)

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. Define the term optimal solution.
2. How do you identify the unbounded solution in LPP?
3. How sensitivity analysis is useful?
4. Write the dual form for the following L.P.P
Maximize $Z = 6X_1 + 4X_2$
Subjected to conditions
 $2X_1 + 4X_2 \leq 30$, $3X_1 + 2X_2 \leq 24$, $X_1 + X_2 \geq 3$,
 $X_1, X_2 \geq 0$
5. State the necessary condition to apply the optimal solution for an initial solution.
6. List the possible options to get an initial solution for a transportation problem.
7. Is float being helpful for a project manager? Justify.
8. What are local minima and local maximum for one dimensional problem show them with simple graph.
9. Mention the limitations of graphical method.
10. Is it correct to choose the highest penalty in Vogel's approximation method? Justify

Part-B (5 × 10 = 50 Marks)

11. Solve the following LPP by Simplex method: [10]
Maximize $Z = X_1 - X_2 + 3X_3$
Subjected to conditions
 $X_1 + X_2 + X_3 \leq 10$
 $2x_1 - 2x_2 + 3x_3 \leq 10$
 $2X_1 - X_3 \leq 2$
and $x_1, x_2, x_3 \geq 0$.
12. Solve the following L.P.P. by dual simplex method. [10]
Minimize $z = 2x_1 + 2x_2 + 4x_3$
subjected to conditions
 $2x_1 + 3x_2 + 5x_3 \geq 2$
 $x_1 + 4x_2 + 6x_3 \leq 5$
 $3x_1 + x_2 + 7x_3 \leq 3$
 $x_1, x_2, x_3 \geq 0$

13. Find optimum solution for the following transportation problem. [10]

		Destinations						Supply
		D ₁	D ₂	D ₃	D ₄	D ₅	D ₆	
plants	P ₁	1	2	1	4	5	2	30
	P ₂	3	3	2	1	4	3	50
	P ₃	4	2	5	9	6	2	75
	P ₄	3	1	7	3	4	6	20
	Requirement	20	40	30	10	50	25	

14. A project has the following activities [10]

Activity	1-2	1-3	2-4	3-4	3-5	4-9	5-6	5-7	6-8	7-8	8-9	8-10	9-10
Time (weeks)	4	1	1	1	6	5	4	8	1	2	1	8	7

Construct network diagram and identify critical path and summarize CPM calculations in tabular form and identify float an each activity.

15. a) How do you identify unbounded solution in Graphical method, show by graph with a suitable example and Simplex method. [5]
 b) What is sensitivity analysis how it is useful for a production manager? [5]
16. a) Find the initial solution for the following transportation by north west corner rule. [5]

		Warehouse				Capacity
		I	II	III	IV	
plant	A	10	5	13	15	25
	B	3	9	18	3	40
	C	10	7	2	2	30
	D	5	11	9	7	15
	E	7	9	10	4	10
	Requirement	35	25	45	10	

- b) Use Cauchy's steepest descent method to minimize $f(x) = 4x_1^2 + 3x_2^2 - 5x_1x_2 - 8x_2$ starting from the point $x_1 = (0,0)$ [5]
17. Answer any two of the following:
- a) Solve the following LPP by graphical method [5]

$$\text{Minimize } z = 2x_1 + 9x_2$$

subjected to conditions

$$x_1 + 4x_2 \geq 5$$

$$3x_1 + x_2 \geq 4$$

$$x_1, x_2, \geq 0$$

- b) Explain the U-V method by taking a suitable example. [5]
 (from remaining)
- c) Solve the following by Lagrange's multiplier [5]
 Minimize $f(x) = 1/2(x_1^2 + x_2^2 + x_3^2)$
 Subjected to
 $g_1(x) = x_1 - x_2 = 0$, $g_2(x) = x_1 + x_2 + x_3 - 1 = 0$